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About the Journal

Founded in 2013, the Journal of Teacher Action Research (ISSN: 2332-2233) is a peer-reviewed online journal indexed with EBSCO that seeks practical research that can be implemented in Pre-Kindergarten through Post-Secondary classrooms. The primary function of this journal is to provide classroom teachers and researchers a means for sharing classroom practices.

The journal accepts articles for peer-review that describe classroom practice which positively impacts student learning. We define teacher action research as teachers (at all levels) studying their practice and/or their students' learning in a methodical way in order to inform classroom practice. Articles submitted to the journal should demonstrate an action research focus with intent to improve the author's practice.

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EXAMINING THE INSTRUCTIONAL DESIGN OF INTERACTIVE AND COLLABORATIVE LEARNING OPPORTUNITIES

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Abstract As interest in fully online programs increases at institutions of higher education, faculty members must adapt their pedagogical practices to successfully integrate the digital tools available for teaching and learning. This action research study examined if and how faculty in a school of education designed instruction that leveraged digital tools to provide collaborative and interactive learning opportunities in an online program in teacher leadership. Framed by tenets of a sociocultural perspective and the technological affordances of multimodality, collaboration, and interactivity, a variety of data was qualitatively analyzed. Findings revealed interactivity was established when instructional design explicitly guided students to interact with others. Interactivity was also established when students were given opportunities to apply content learned in class, analyze their actions, and report on the experiences to others using multiple modes accessible through digital tools. Related to collaboration, analysis indicated that program design encumbered the implementation of collaborative activities due to large class enrollment and the short duration of the academic semester. These findings will inform future revisions to the program under study as well as be shared with other faculty who are charged with designing online courses but may not have online pedagogical expertise.

Keywords: teacher action research, technological affordance, instructional design, higher education, online learning

Introduction

As interest in fully online programs increases at institutions of higher education, faculty must adapt their pedagogical practices to successfully integrate the digital tools available for teaching and learning (Adams Becker et al., 2017). Simply connecting students to instructors and classmates using technology does not result in thoughtful collaboration and

interactivity, indicators of effective online teaching practices (Beach & O'Brien, 2015). Instead, focus should be placed on how instruction is designed to create these meaningful learning opportunities that meet course objectives (Karchmer-Klein, Mouza, Shinas, & Park, 2017).

Most online courses in higher education are delivered through a learning management system (LMS), a password-protected cloud-based architecture that provides a common online location to exchange information for teaching and learning (Kroner, 2014). Each LMS (e.g., Canvas, Blackboard) encompasses a set of multimodal digital tools with unique technological affordances. For instance, many incorporate a peer review tool that facilitates interactivity between classmates through written language, images, audio and video. The tool can be easily integrated into an online course, but the way in which the learning opportunity is designed will ultimately influence the depth and breadth of student learning, not the technology itself.

Instructional design typically rests on course instructors who are experts in their fields of study, but may not be expert pedagogues of teaching and learning (Ko & Rossen, 2017). This, in turn, may lead to an overreliance on teacher-directed learning activities (Koedinger, Booth, & Klahr, 2013; Rienties et. al., 2012). For instance, when studying patterns in the instructional design of 157 online learning modules, Toetenel and Rienties (2016) found didactic teaching methods, where information was transferred electronically from instructor to student, were the most commonly integrated.

As teacher educators who research and implement traditional and digital pedagogical approaches, we set out to examine the instructional design of courses in our own 100% online teacher leadership graduate program. This action research project was important to conduct because the lessons learned could be used to inform not only our own practice, but other faculty who are charged with designing online courses but may not have online pedagogical expertise. To achieve this aim, we explored the following research question: In what ways did online faculty's instructional decision-making support, or not support, collaboration and interactivity amongst online course participants?

Theoretical Framework

This study draws upon tenets of a sociocultural perspective, specifically social constructivism (Vygotsky, 1978) and situated learning theory (SL) (Brown, Collins, & Duguid, 1989). Social constructivism suggests learners develop through their interactions with other people's values, beliefs, and ways of thinking (Tracey & Morrow, 2017). SL suggests learning develops in authentic contexts with the application of content to real life experiences (Herrington & Oliver, 2000). These lenses are especially useful when directly applied to promote collaborative learning opportunities amongst students in coursework that does not include face to face instruction. In this way, instructors deliberately and purposefully design instruction that requires group problem-solving and engagement in discussions about relatable experience that would otherwise be unachievable through autodidactic learning or other non-peer collaborative approaches (Oztok, 2016; Vygotsky,1978).

Literature Review

Each LMS encompasses a set of multimodal digital tools with unique technological affordances (Beach, Anson, Breuch, & Reynolds, 2014). Three of the most commonly identified in the research literature are multimodality, interactivity, and collaboration (Karchmer-Klein et al., 2017; Beach & O'Brien, 2015). When faculty better understand these affordances, they are better equipped to leverage them in ways that create contexts where collaborative and interactive learning opportunities flourish.

Multimodality. Modes are signs or symbols that communicate meaning (Kalantzis, Cope & Cloonan, 2010). LMSs incorporate several types of tools that allow for the consumption and production of multimodal materials. Canvas, for instance, allows teachers and students to embed video, audio, static images, and hyperlinks. Combining modes (e.g., words and audio) in online activities, such as discussion posts, transforms the learning environment by interjecting non-verbal cues in ways that allow participants to experience each other as humans rather than computer-generated words on a screen (Lee, 2004). Research examining instructor multimodal feedback indicates value in its use. For instance, students reportedly find audio and video comments more personal (Henderson & Phillips, 2015) and easier to comprehend (West & Turner, 2016) than written feedback. Moreover, there is evidence that students who receive, process, and interpret content presented through multiple modes score higher on assessment measures than those who learn from a single mode (Frisby, Limperos, Record, Downs & Kercsmar, 2013).

Interactivity. Interactivity is about the exchange of ideas and perspectives with others. In an educational setting, interactivity can take place between students, students and instructors, as well as students and content (Moore, 2013). Researchers have studied the interactivity afforded through LMS digital tools such as online discussion boards (Kent, Laso & Rafaeli, 2016), peer review (Sullivan & Watson, 2015), and video conferencing (Martin & Parker, 2014). In each case, findings emphasize the critical role of thoughtful instructional design. Martin, Wang and Sadaf (2018), for example, examined graduate students' perceptions of how they used digital tools to interact with instructors. Although previous studies indicated that synchronous audio and visual chats could facilitate community building, (Reushle & Loch, 2008), participants in this work did not perceive them as helpful. Instead, students reported the sessions' purposes were not well-articulated nor did they meet their learning needs. Thus, although the LMS conference tool afforded opportunities for interactivity, the design of the student-instructor activity fell short.

Collaboration. Collaboration is the process by which members of a group negotiate, share, and construct meaning in response to stimuli. The increased visibility of one's own work and the opportunities to express creativity through collaborative online activities have been found to motivate and usefully engage students (Trentin, 2009). In a study of graduate educational technology majors, Karpova, Correia and Baran (2009) found that students were motivated to learn new technologies to collaborate when other online communication efforts failed. Students quickly determined that the lack of non-verbal cues in asynchronous written collaborative digital settings was problematic. To alleviate the issue, students initiated the use of the LMS's video function to they could talk as a group in real-time.

Like interactivity, students seem to be more invested when collaborative tasks are well defined and scaffolded to support their understanding of group dynamics. Kear, Woodthorpe, Robertson and Hutchison (2010) found this when studying the use of wikis in an online course in higher education. Similar to Google Docs, wikis are collaborative digital writing spaces where students must divide responsibilities associated with the assigned tasks and how to respectfully respond and revise classmates' work given the open nature of the writing process. Kear et al., (2010) found that the lack of preparedness on how to use a wiki influenced the quality of student work and students felt high risk about their engagement in the activity.

Taken together, these affordances can be used to build social learning environments. When affordances are leveraged successfully, both aforementioned theoretical frames are satisfied. That is, social constructivism can be seen in the instructors' creation of a collaborative online learning environment that enable users to make meaning in ways that would not have been possible had they not engaged in the synergistic online space. Instructors' online course design also extends beyond social constructivism by situating the learning and meaning making process in a highly contextualized setting that mimics the future lived experiences of the learners in their authentic settings, thus incorporating the signature components of situated learning theory.

Methodology

Research Context. The Master of Education in Teacher Leadership (MEdTL) is a fully online program designed for full-time certified teachers who seek to fill school leadership roles such as instructional specialist, data coach, and teacher mentor. Coursework is aligned with the Teacher Leader Model Standards (Teacher Leader Exploratory Consortium, 2011) and Middle States Commission on Higher Education.

The MEdTL was chosen as the focus for this action research study for two reasons. First, the faculty were highly dedicated to the program's success and valued the role of technology in candidate learning. Moreover, they were experts in not only their content areas, but also pedagogy, given their experience and research as teacher educators. Second, it was the first fully online graduate program offered by the university's School of Education. This study was seen as an opportunity to identify strengths and weaknesses and make modifications as needed.

MEdTL candidates complete ten, three-credit courses taught asynchronously in seven-week sessions using Canvas (LMS). It was decided by faculty that all courses would be organized around a Situated Learning (SL) model that directly connected candidates' professional experiences to graduate course content (Clarke & Hollingsworth, 2002). Therefore, a requirement of admission was current employment in a professional setting allowing candidates to practice leadership skills learned in class. Individual courses had large enrollments of 45-65 candidates.

Participants. Data were collected from four full-time faculty who held doctorate degrees in education (pseudonyms replace participants' real names in this article). The participants, three females and one male, all Caucasian, had an average of 21 years overall teaching experience, an average of 14 years of experience as higher education faculty, and an average of almost 6 years of online teaching experience. Their fields of expertise included

pedagogical decision-making across content areas, literacy education, action research, and mobile computing environments. The faculty members did not have any formal training to teach online, describing themselves as "self-taught" and mainly relying on their pedagogical expertise coupled with peer support to guide the development of their courses (see Table 1 for participant and course information).

Table 1: Demographic Information as Reported by Faculty

Gender	Faculty Member (Pseudonym)	Highest Degree	Years of Teaching Experience	Years Teaching Online
Male	Dr. Bower	Ph.D.	29	4
Female	Dr. Kostner	Ph.D.	23	13
Female	Dr. Merrin	Ed.D.	20	5
Female	Dr. Santos	Ph.D.	13	1

Positionality. Rachel and Elizabeth, two of the three authors of this manuscript, were also faculty instructors in the program. Jann, the third author, was a doctoral candidate. Mirroring the work of action researchers (Herr & Anderson, 2005), self-study advocates (Tidwell, et al., 2009), and adopting *a teacher as inquiry stance* (Feiman-Nemser, 2012) enabled us to examine our own practice through the externalization and joint examination of our design experiences.

To secure credibility and confirmability (Herr & Anderson, 2005) and to make use of our 'collaborative resources' (Melrose, 2001), Jann was solely responsible for the first wave of data analysis and Rachel and Elizabeth initially took on the role of informant (Eisner, 1998). Additional validity criteria such as transferability and ecological validity were strengthened by clearly situating this study in the context from which the data were culled; thereby allowing research consumers from higher education, and online course instructors, to draw parallels to their own contexts (Guba & Lincoln, 1981; Bloomberg & Volpe, 2008).

Data Sources and Analysis

LMS Digital Tools. Before exploring the faculty's decision-making around the available online learning tools (i.e., Pages, Discussions, Peer Review, Collaborations), the tools themselves were analyzed against affordances (multimodal, interactivity, and collaboration) following an inductive and deductive process (Patton, 2015). We read descriptions of the tools' capabilities on the Canvas website and conducted independent reviews by utilizing them in ways we were familiar with in our own work. Next, we met and referred to our notes to identify specific instances of if/how the tools included the aforementioned

affordances. Once we reached agreement about the digital tools' affordances, we illustrated the analysis (see Table 2).

Table 2: LMS Tools and Affordances Leveraged by Instructors

Tool	Types of Activities	Written Language	Oral Language	Visual	Audio	Interactivity	Collaboration
Pages	Provide content through Canvas or other applications.	X	X	X	X		
Discussions	Provide space to talk with classmates and instructor	X	X	X	X	X	X
Peer Review	Provide opportunity to peer review work	X	X	X	X	X	
Collaborations	Provide space to collaborate on the same document	X	X	X	X		X

Modules. To limit the pool to a manageable corpus of codable data, participants were asked to identify one module from each class they designed which was most representative of their entire course in terms of technological tools used and attention to overall course learning goals. A total of eight course modules were identified. The number of activities within a module ranged from eight to seventeen.

To begin analysis, tables were constructed using the following headings: (a) learning objective, (b) activity, (c) digital tool, and (d) technological affordances. The first three

columns were immediately filled for each module. Second, we worked individually and then collaboratively to conduct deductive analysis of the modules using the technological affordances (multimodality, interactivity and collaboration) as a priori codes. This process consisted of looking across the learning objectives, activities' descriptions, and the selected digital tools and cross-coding and axial-coding against the affordances (Patton, 2015). Thirdly, we systematically examined the activities to identify similarities and differences among and between them to identify patterns related to if and how the activities provided opportunities to collaborate and interact. Table 3 is an example of a coded set of activities within one module.

Table 3: Example of Coding Activities Within a Module

Learning Objective	Activity	Canvas Digital Tool	Leveraged Affordance
To understand and demonstrate knowledge of different coaching models.	Read articles and watch video on peer coaching.	Pages	Multimodality
	Read articles and watch video on content-specific coaching.	Pages	Multimodality
	Read articles and watch video on mentoring.	Pages	Multimodality
	Read articles and watch video on cognitive coaching.	Pages	Multimodality
	Watch video and determine coaching type implemented. Post response in discussion board with evidence supporting your answers. Respond to at least one classmate's post with questions, affirmations, or healthy debate.	Discussions	Multimodality Interactivity

Interviews. Jann conducted semi-structured interviews with each faculty participant with the purpose of learning more about the instructors' decision-making, perceptions of online teaching, and their assessment of the overall module design including how the LMS tools were used to facilitate student learning. Interviews were transcribed verbatim, copied into

NVivo software, and analyzed using an a priori coding system aligned to the technological affordances of multimodality, interactivity and collaboration.

Overall Analysis. Once each data set was analyzed, using the constant comparison method, we cross-compared the consistency of findings (Patton, 2015). For example, we compared and contrasted how participants described their module design with the analysis of how we identified the technological affordances were leveraged within the module activities. Next to further examine our findings, Jann conducted member-checking with participants (Lincoln & Guba, 1985). She drafted a full report outlining themes along with data examples and shared the document with the faculty. To reach a 75% member-check rate, Jann met with three of the four participants for 90-minutes to discuss reactions to the report, clarification of points, and the opportunity to answer questions. Overall, results from the member check served to confirm the original analysis.

Results

Requirements Scaffolded Interactivity. An examination of candidate work within Canvas indicated two important findings related to interactions among and between candidates and instructors. First, all interactions, such as candidates' discussion board posts and classmates' responses were presented using written language unless the directions specifically required the use of a different mode. In other words, candidates chose to respond to class activities using typed words rather than audio or video. This finding was noteworthy because the Canvas tools encompassed multimodal affordances allowing candidates to seamlessly respond with a choice of modes. Moreover, the majority of instructor feedback to candidates was provided with typed written language although, again, the Canvas grading feature allowed for video or audio responses. Dr. Kostner was the only instructor who designed instruction that encouraged, and sometimes required, candidates to respond with audio or video. Her interest and experience with digital tools seemed to influence her instructional design. She explained in her interview, "I like using different digital tools and challenging candidates to present their thinking in various ways, especially since many candidates communicate via text and read from web pages rather than traditionally printed books."

Analysis also revealed interactivity mostly took place between candidates only when it was required. For example, instructors designed two types of activities that utilized the Canvas Discussions tool. Reflective posts were written by candidates in response to teacher-created prompts after reading, viewing, and participating in course content and activities. Although the instructor could provide comments and classmates were encouraged to respond, there was no expectation these would occur. We did not find any instances of candidates responding to reflective posts in the modules examined for this study.

Discussion posts, on the other hand, were like reflective posts but required candidates to respond to at least one classmate. In other words, there were grades attached. In all instances that we examined for this study, candidates responded to at least one classmate's post and fulfilled this requirement. Although the depth and breathe of the interactivity seemed to be dependent upon how the instructor designed the activity. For example, Table

4 includes excerpts from grading rubrics used to assess candidates' responses to classmates' discussion board posts in three different classes:

Table 4: Example of Grading Rubrics for Discussion Posts

Course	Criteria	No Credit	Half Credit	Full Credit
#1	Response to classmate	Does not respond to classmate	Response to 1 classmate	Response to at least 2 classmates
#2	Responsiveness	Does not interact with classmates	Response refers to 2 other classmates' opinions	Response refers to other classmates' opinions as well as readings
#3	Response explicitly responds to group member posts, and substantively builds on them by furthering their argument, constructively offering a different perspective, or posing questions likely to further peers' thinking about the issue.	Response fulfills all dimensions of criteria	Response does not respond to group posts OR does not substantively build on them	Response explicitly responds to group member posts, and substantively builds on them by furthering their argument, constructively offering a different perspective, or posing questions likely to further peers' thinking about the issue.

There are obvious differences between the rubrics. Rubrics #1 and #2 mention the exact number of responses that need to be posted to receive credit whereas Rubric #3 is vague. Rubric #3 provides more detailed criteria, explicitly stating the types of feedback the instructor would to evaluate the response. Analyzing candidate work was outside of the scope of this paper so we do not share actual posts in this paper. However, the analysis of the rubrics and other aspects of the instructional design indicate that candidates followed the directions presented to them when interacting with classmates in these online courses.

Situated Learning Scaffolded Interactivity. Dr. Merrin described the application of content to real world examples as "something taken very seriously in the program" and she described assignments as "not abstract but really tangible things that are relevant to

[candidates'] daily jobs and responsibilities." Analysis revealed that instruction designed around such SL opportunities scaffolded interactivity in the MEdTL courses.

One type of SL design required candidates to connect their professional experiences to course readings and videos by responding to teacher-created prompts. Close analysis revealed the majority of prompts did not merely require candidates to describe their professional settings in relation to the topic, but rather extend their thinking to consider challenges, alternative approaches, or other perspectives. For example, after watching videos and reading articles on ethical action research as well as conducting a critique of an action research article, candidates were asked to respond to the following prompt: "What innovations have you implemented that do not seem to be working in the ways that you had anticipated?" Another example is from a course on state curriculum standards where candidates learned how updated standards required shifts in teaching and learning. The prompt was:

> Describe the kinds of changes that you have already made in your school or classroom -- or that you feel you must make -- in order to meet the demands of the state standards. Clearly identify the changes that you made or will have to make, why you made them (or have to make them), and whether or not you or your colleagues are having difficulties/discussions/arguments about these changes, and the nature of those discussions.

Again, this prompt went beyond summarizing what was learned from class resources to requiring candidates to make complex connections to their professional settings from the role of teacher leader.

In some instances, the responses to teacher-created prompts were completed in public discussion boards accessible to classmates, promoting interactivity among them by sparking debate, agreement, or additional questions. In other cases, candidates' responses were posted privately within the Canvas Assignments tool, which allowed interactivity to take place between the candidate and instructor.

Another type of SL design that precipitated interactivity invited MEdTL candidates' colleagues or other experts into the online learning space These activities reflected SL since the information drawn came from people who shared similar professional settings. For example, in a course on technology-based collaborations MEdTL candidates created a Professional Learning Network focused on a problem of practice (PoP) identified in their school. Candidates were required to survey colleagues and report back their findings, explaining how they narrowed down their PoP and how it was applicable. This activity precipitated interactivity between MEdTL candidates and their colleagues.

A third way interactivity was scaffolded by SL was when the instructional design leveraged multimodality, specifically video and audio. For instance, a coaching course required candidates to videotape themselves leading a professional development conversation with a colleague. Candidates uploaded the videos directly into the *Peer Review* tool in Canvas where classmates analyzed the conversations and provided verbal feedback using the audio feature as they evaluated the video. Using video allowed the instructor and classmates to make their own assessments of content application rather than relying solely on the

candidates' accounts of what took place. Dr. Kostner explained, "Video is a powerful tool especially when we're asking candidates to describe their own practice. It helps them look at their work more objectively and it also helps their classmates do the same."

Participants agreed that framing activities from a SL lens benefitted learning in at least two ways. First, SL provided instructors with windows into candidates' professional contexts. In turn, instructors felt they had more insights about challenges candidates confronted when attempting to implement content from the coursework and they could provide individualized feedback. Second, instructors felt sharing real-life experiences scaffolded group cohesion, creating social settings where candidates could make sense of the stories classmates told about their experiences related to course content. Dr. Bower explained that he purposely built SL activities into his courses so that candidates learned more about each other. He stated this approach led to "more robust interactions" in class.

Program Design Influenced Collaboration. In this study, collaboration was coded when an activity required a group of candidates to analyze and apply content to develop a synthesized outcome representing their combined efforts. Using this definition, collaboration was evident in only one module out of the eight analyzed. A course on equity issues required candidates to brainstorm responses to a case study and create a plan of action based on their collective thinking. Specifically, the instructions guided candidates to use a collaborative writing tool, such as Google Docs, or video conferencing tool, such as Canvas Collaborations, to work together to "build consensus about the ideal response that represents the group's thinking."

Given only one module out of eight reflected collaboration, MEdTL instructors were asked about their views of online collaboration during their interviews and the member-checking meeting. There was agreement by the participants that candidates would benefit from working together on class projects, especially since the candidate demographics reflected a range of background experiences and professional settings. Dr. Merrin noted, "Most of my face to face class time is collaborative. Candidates turn and talk all the time, sharing ideas and building consensus." However, instructors identified two challenges to leveraging the collaborative affordances within the digital environment.

As the first fully online program in the School of Education that served as the setting for this study, the administration determined course enrollments would not be limited in order for it to be financially viable. Thus, 45-65 candidates were registered in each course. To put this in perspective, face-to-face graduate courses at this institution were typically capped at 20 candidates. Although they were deeply invested in the program, faculty voiced concern over managing large numbers of candidates, especially in an online environment where they needed to rely on digital tools to scaffold the collaboration.

The second challenge was the short duration of the online semester. Each three-credit course ran for seven weeks yet covered the same amount of content as in the regular 14-week semester. Faculty found it difficult to introduce candidates to content, provide situated learning activities, assess understanding, and provide opportunities to collaborate within such a condensed amount of time. As Dr. Santos explained, "There is a lot of back and forth between instructor and candidate [in my class]. So with large enrollments I'm going to have 60 something candidates that I am going to have to help with their work and

it's a seven-week semester. I just don't know how to do it." In sum, although Canvas tools allowed for collaboration to take place, participants reportedly chose not to leverage this affordance due to program design.

Discussion

A In this study we did not evaluate the effectiveness of the learning activities nor candidates' engagement in the course, therefore we do not presume an impact on student learning. Instead, we focus on three insights that can inform revisions to our instructional design.

Findings indicated the way learning opportunities were designed influenced candidates' use of multimodality. This was evident in that the majority of candidate responses and class interactions were composed with written language, unless directions specifically required the use of a different mode. Since we did not interview candidates we cannot say for certain why they relied mostly on typed words. Perhaps they were unsure, unaware, or disinterested in representing their knowledge with modes other than words. Similarly, when faculty required interactivity, such as responding to classmates' posts on the discussion boards, candidates engaged in these activities. Yet, when they were not required but given space to interact, few candidates did. Overall, these findings taught us that faculty must closely examine the affordances of the digital tools they integrate into their instruction, decide if there are modes or interactions candidates would benefit from, and then invite candidates to represent their knowledge in different ways. Activities should then be structured around the integration of these decisions with clear and explicit instructions. By restructuring activities in these ways, lesson design can transition online courses from isolated spaces to social, interactive learning communities (Lee, 2004). Additionally, instructors should model how to leverage multimodality, collaboration and interactivity within the LMS. This would provide candidates with concrete examples from which they could learn. Of course, this requires faculty to invest in professional development opportunities that explicate how online teaching differs from traditional face to face pedagogy.

Findings also indicated SL precipitated interactivity in online courses by providing concrete starting points for discussions. SL encouraged candidates to share their individual professional stories and actively connect these stories to course content. Interestingly, instructors also leveraged multimodality to invite others into the learning experience through video and audio representations. This finding taught us that framing courses around SL was a good decision, but that the tools for collaboration are not yet being optimized by candidates or instructors, particularly as they pertain to communication for discussion using modes other than typed words.

According to faculty, program logistics also seemed to influence instructional design. Faculty voiced concerns with integrating collaborative projects due to class size and the short duration of the semester. These obstacles reflected the realities of teaching online at this university. They also highlighted a tension between research-based teaching practices and university-mandated policies. For example, although they understood the importance of collaboration, the faculty mostly shied away from graded group activities because the management was too cumbersome, especially when class enrollment exceeded 50

candidates. This tension is not unique to this particular setting. Universities around the world are prioritizing student-centered, hands-on learning opportunities over rote memorization, yet not providing faculty with the professional development or support to re-envision classroom practices (Adams Becker et al., 2017). Although there is no consensus about how many students are optimal in an online course, research indicates "14% more hours are required to teach the same number of students online at a distance than in the traditional classroom" (Tomei, 2006, 539). As administrators make enrollment decisions based on financial needs, it is critical to consider what compromises must be made to sustain the level of student enrollment.

In light of these findings, we share preliminary steps we plan to take to improve our instructional design. First, we plan to lobby our administration for small class sizes, which would make grading collaborative projects less unwieldly. Second, we plan to encourage our candidates to leverage multimodality afforded by the technology. Finally, we will conduct a course mapping exercise across all seven modules from all ten courses, where we collaboratively identify the features of our course assignments that are aimed at promoting collaboration and connections to highly contextualized lived-experiences.

Limitations and Further Research

This work should be viewed in relation to three limitations. First, a primary source of data was content from eight different course modules, only a subset of instructional content within each course. In turn, there may have been collaborative and/or interactive opportunities that were not examined. Additionally, this method removed the activities from the context of the entire course. It would be useful to conduct a systematic study of an entire course to evaluate the full gamut of activities. Second, since we focused on learning opportunities and not learning outcomes in this specific inquiry, candidate data were not collected. Prior research indicates that much can be learned from student perspectives at any grade level (e.g., Coiro & Dobler, 2007; Jimenez & Meyer, 2016). Such an approach in future studies would infuse their important voices. Third, we examined courses designed by experts in the field of education for a particular education program. Moreover, three out of four participants had experience designing fully online courses. Thus, the results will likely differ when exploring online learning environments designed by faculty with expertise outside the field of education or with less technology experience.

Conclusion

According to the 2017 NMC Horizon Report Higher Ed Edition, "Technology and digital tools have become ubiquitous, but they can be ineffective or dangerous when they are not integrated into the learning process in meaningful ways" (Adams Becker et al., 2017, p. 7). Designing online instruction, however, is a complex and demanding task that will not occur without systematic explicit instruction in the pedagogies associated with digital teaching. We suggest higher education faculty engage in similar types of program review as described in this paper and also be given opportunities to strengthen their understandings of online instructional design.

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References

Adams Becker, S., Cummins, M., Davis, A., Freeman, A., Glesinger Hall, C. & Ananthanarayanan, V. (2017). *NMC Horizon Report: 2017 Higher Education Edition*. Austin, Texas: The New Media Consortium. Retrieved March 6, 2018 from https://www.learntechlib.org/p/174879/.

Karchmer-Klein, R., Mouza, C., Shinas, V., & Park, S. (2017). Patterns in teachers' instructional design when integrating apps in middle school content area teaching. *Journal of Digital Learning in Teacher Education, 33*(3), 91-102.

Beach, R., C. M. Anson, L. A. K. Breuch, and T. Reynolds, T. 2014. *Understanding and creating digital texts: An activity-based approach.* Lanham, MD: Rowman & Littlefield.

Beach, R., & O'Brien, D. (2015). Fostering students' science inquiry through app affordances of multimodality, collaboration, interactivity, and connectivity. *Reading & Writing Quarterly*, *31*(2), 119-134. doi:10.1080/10573569.2014.962200.

Bloomberg, L., & Volpe, M. (2008). *Completing your qualitative dissertation: A roadmap from beginning to end.* Thousand Oaks, CA: Sage.

Brown, J. S., Collins, A. & Duguid, D. (1989). Situated learning and the culture of learning. *Educational Researcher, 18*(1), 32-42.

Castek, J., Beach, R., Cotanch, H., & Scott, J. (2014). Examining middle-school students' uses of Diigo annotations to engage in collaborative argumentative writing. In R. Anderson & C. Mims (Eds.), *Handbook of research on digital tools for writing instruction in K-12 settings* (pp. 80 – 101). Hershey, PA: IGI Global.

Clarke, D., & Hollingsworth, H. (2002). Elaborating a model of teacher professional growth. *Teaching and Teacher Education, 18*(8), 947-967.

Coiro, J., & Dobler, E. (2007). Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly*, *42*(2), 214-257.

Eisner, E. (1998). *The enlightened eye: Qualitative inquiry and the enhancement of educational practice.* Upper Saddle River, NJ: Merrill, Prentice Hall.

Feiman-Nemser, S. (2012). *Teachers as learners.* Cambridge, MA: Harvard Education Press.

Frisby, B., Limperos, A. M., Record, R. A., Downs, E., & Kercsmar, S. C. (2013). Students' perceptions of social presence: rhetorical and relational goals across three mediated instructional designs. *Journal of Online Teaching and Learning, 9,* 468-480.

Guba, E., & Lincoln, Y. (1981). *Effective evaluation: Improving the usefulness of evaluation results through responsive and naturalistic approaches*. San Francisco, CA: Jossey-Bass.

Henderson, M. & Phillips, M. (2015). Video-based feedback on student assessment: Scarily personal. *Australasian Journal of Educational Technology*, *31*(1), 51-66.

Herr, K., and G. L. Anderson. (2005). *The Action Research Dissertation: A Guide for Students and Faculty.* Thousand Oaks, CA: Springer.

Herrington, J., & Oliver, R. (2000). An instructional design framework for authentic learning Environments." *Educational Technology Research and Development, 48*(3), 23-48.

Jimenez, L. M., & Meyer, C. K. (2016). First impressions matter: Navigating graphic novels utilizing linguistic, visual, and spatial resources. *Journal of Literacy Research, 48(4), 423-447.*

Kalantzis, M., Cope, B., & Cloonan, A. (2010). A multiliteracies perspective on the New Literacies. In E.A. Baker (Ed.), *The New Literacies: Multiple Perspectives on Research and Practice* (pp. 61-87). New York: Guilford Press.

Karpova, E., Correia, A, & Baran, E. (2009). Learn to use and use to learn: Technology in virtual collaboration experience. *Internet and Higher Education, 12, 45-53.*

Kear, K., Woodthorpe, J., Robertson, S. & Hutchison, M. (2010). From forums to wikis: Perspectives on tools for collaborations. *Internet and Higher Education, 13,* 218-225.

Kent, C., Laslo, E., & Rafaeli, S. (2016). Interactivity in online discussions and learning outcomes. *Computers & Education,* 97, 116-128.

Ko, S., & Rossen, S. (2017). *Teaching Online: A Practical Guide.* New York: Routledge.Koedinger, K., Booth, J. L. & Klahr, D. (2013). Instructional complexity and the science to constrain it. *Science*, (342)6161, 935–937.

Kroner, G. (2014) Does your LMS do this? Retrieved from: http://edutechnica.com/2014/01/07/a-model-for-lms-evolution/

LaPointe, D. K., Greysen, K. R. B., & Barrett, K. A. (2004). Speak2Me: Using synchronous audio for ESL teaching in Taiwan. *The International Review of Research in Open and Distance Learning*, 5(1).

Lee, K. (2004). "Presence, explicated." *Communication Theory.* 14(1): 27-50.

Martin, F. & Parker, M. A. (2014). Use of synchronous virtual classrooms: Why, Who, and How? *Journal of Online Learning and Teaching,* 10(2), 192-210.

Martin, F., Wang, C. & Sadaf, A. (2018). Student perception of helpfulness of facilitation strategies that enhance instructor presence, connectedness, engagement and learning on online courses. *Internet and Higher Education, 37, 52-65.*

Melrose, M. (2001). Maximizing the rigor of action research: Why would you want to? How could you?" *Field Methods, 13*(2), 160-180.

Moore, M. (Ed). (2013). *Handbook of distance education*. New York, NY: Routledge.

Oztok, M. (2016). Cultural ways of constructing knowledge: the role of identifies in online group discussions." *International Journal of Computer-Supported Collaborative Learning, 11*(157), 157-186. doi:10.1007/s11412-0169233-7

Patton, M. Q. (2015). *Qualitative research & evaluation methods.* (4th ed). Thousand Oaks, CA: Sage.

Rienties, B., Kaper, W., Struyven, K., Tempelaar, D. T., Van Gastel, L., Vrancken, S. et al . (2012). A review of the role of information communication technology and course design in transitional education practices. *Interactive Learning Environments, 20*(6), 563 -581.

Reushle, S. & Loch, B. (2008). Conducting a trial of web conferencing software: Why, How and Perceptions form the Coalface. *Turkish Online Journal of Distance Education 9*(3), 19-28.

Sullivan, D., & Watson, S. (2015). Peer assessment within hybrid and online courses: Students' views of its potential and performance. *Journal of Educational Issues, 1(1).* Retrieved March 6, 2018 from: https://files.eric.ed.gov/fulltext/EJ1131766.pdf

Teacher Leader Exploratory Consortium. (2011). Teacher Leader Model Standards. Retrieved March 4, 2018 from: http://www.nea.org/assets/docs/TeacherLeaderModelStandards2011.pdf

Tidwell, D., Heston, M., & Fitzgerald. L. (2009). *Research Methods for the Self-Study of Practice*, Vol. 9. Springer: New York.

Toetenel, L. & Rienties, B. (2016). Analysing 157 learning designs using learning analytic approaches as a means to evaluate the impact of pedagogical decision making. *British Journal of Educational Technology, 47*(5), 981-992.

Tomei, L. A. (2006). The impact of online teaching on faculty load: Computing the ideal class size for online courses. *Journal of Technology and Teacher Education, 14*(3), 531-541.

Tracey, D. H. & Morrow, L. M. (2017). *Lenses on reading: An introduction to theories and models. (3rd edition).* New York: Guilford Press.

Trentin, G. (2009), Using a wiki to evaluate individual contribution to a collaborative learning project. *Journal of Computer Assisted Learning, 25,* 43–55.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* Cambridge, Mass.: Harvard University Press.

West, J. & Turner W. (2016). Enhancing the assessment experience: improving student perceptions, engagement and understanding using online video feedback. *Innovations in Education and Teaching International*, 53(4): 400-410. doi: 10.1080/14703297.2014.1003954